

(Ch. 16)
TEST Friday 5/9

Ch. 17-18 from 5/12 to 5/21 or 5/22

Review (5/22) 5/23

EXAM 5/27

Worksheet 16-10 Review:

2. Outcome	Spin \$15	Spin \$30	Spin \$100
$X = \text{Profit}$	\$35	\$20	\$-50
$P(X)$	0.25	0.55	0.20

$$\begin{aligned} b) \mu = E(X) &= (0.25)(\$35) + \\ &\quad (0.55)(\$20) + \\ &\quad (0.20)(\$-50) \\ &= \$9.75 \end{aligned}$$

$$c) 1. (X - \mu)$$

$$\$35 - \$9.75 = \$25.25$$

$$\$20 - \$9.75 = \$10.25$$

$$\$-50 - \$9.75 = \$-59.75$$

$$2. (25.25)^2 = 637.5625$$

$$(10.25)^2 = 105.0625$$

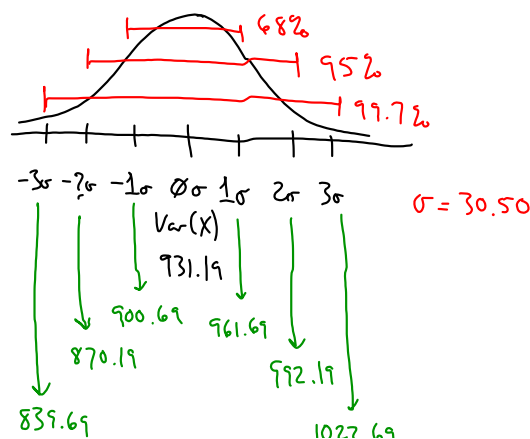
$$(-59.75)^2 = 3570.0625$$

$$\begin{aligned} 3. \text{Var}(X) &= (0.25)(637.5625) + \\ &\quad (0.55)(105.0625) + \\ &\quad (0.20)(3570.0625) \\ &= 931.1875 \end{aligned}$$

$$\text{Var}(X) = \sum P(X)(X - \mu)^2$$

$$4. \sigma = \sqrt{\text{Var}(X)} = \sqrt{931.1875} = 30.5$$

d) This game should earn a profit of \$931.19 with a standard deviation of \$30.50.



Probability Models:

• Bernoulli Trials

- Only two possible outcomes
 - Success
 - Failure
- Probability of success (p) is the same for every trial
- Trials are independent
- Common examples: Tossing a coin, shooting free throws

• Binomial Probabilities (Model)

- The number of trials $\rightarrow n$
- Probability of success $\rightarrow p$
- Model name $\rightarrow \text{Binom}(n, p)$
- Probability of failure $\rightarrow q$
- Total Probability $\rightarrow p + q = 1$
- Probability of exactly k successes in n trials:

$$P(k) = \underbrace{\binom{n}{k}}_{\substack{\text{combination} \\ \text{part}}} \underbrace{(p^k)}_{\substack{\text{prob.} \\ \text{of} \\ \text{success}}} \underbrace{(q^{n-k})}_{\substack{\text{prob.} \\ \text{of} \\ \text{failure}}}$$

$$\text{Mean: } \mu = np$$

$$\text{Standard Deviation: } \sigma = \sqrt{npq}$$

- CALCULATOR:

$$2\text{nd VARS (DISTR)} \rightarrow A: \text{binompdf}(\quad)$$

$$\rightarrow n, p, x$$

$\begin{array}{l} \text{\# trials} \\ \text{prob. of} \\ \text{success} \end{array} \Bigg| \begin{array}{l} \text{\# successes} \\ \text{desired} \end{array}$

- Independence

- Bernoulli trials must be independent.
- If this assumption is violated, okay to proceed as long as sample is less than 10% of population.
- 10% Condition (see above)